

WHAT IS CLAIMED IS:

1. A method of inactivating microbes in a platelet composition, the method comprising illuminating the biological fluid with pulses of a light having at least one wavelength within a range of 170 to 2600 nm and a fluence greater than about 0.001 J/cm<sup>2</sup>, the illumination effective for inactivating microbes in the platelet composition and for decreasing platelet aggregation by not more than about 40%.

2. The method of inactivating microbes of claim 1 wherein the platelet composition is illuminated with pulses of light having wavelengths within a spectral range of at least between about 240 nm and about 280 nm and having a pulse duration of less than 100 ms.

3. The method of inactivating microbes of claim 1 wherein the platelet composition is selected from the group consisting of platelet rich plasma, leukocyte reduced platelets, non-leukocyte reduced platelets, synthetic platelet substitutes, artificial platelets, recombinant platelet products, and mixtures thereof.

4. The method of inactivating microbes of claim 1 wherein the biological fluid is illuminated with an amount of light effective for providing a fluence level of about 0.1 to about 0.6 J/cm<sup>2</sup>.

5. A method of inactivating microbes in a platelet composition, the method comprising illuminating the platelet solution with pulses of a light having at least one wavelength within a range of 170 to 2600 nm and a fluence level of about 0.05 to about 15 J/cm<sup>2</sup>, the illumination effective for inactivating microbes in the platelet composition by at least about 2 logs, and for

decreasing platelet aggregation by not more than about 40%.

6. The method of inactivating microbes of claim 5 wherein the platelet composition is illuminated with  
5 pulses of light having wavelengths within a spectral range of at least between about 240 nm and about 280 nm and having a pulse duration of less than about 100 ms.

7. The method of inactivating microbes of claim 5 wherein the platelet composition is selected from the  
10 group consisting of platelet rich plasma, leukocyte reduced platelets, non-leukocyte reduced platelets, synthetic platelet substitutes, artificial platelets, recombinant platelet products, and mixtures thereof.

8. A method of inactivating microbes in a platelet  
15 composition, the method comprising:

flowing the platelet composition through a treatment chamber, the treatment chamber being light transmissive to at least 1% of a light treatment having at least one wavelength within a range of 170 to 2600 nm;

20 illuminating the platelet composition with the light as the platelet composition is flowed through the flexible treatment chamber;

inactivating microbes within the platelet composition,

25 the method effective for inactivating microbes in the platelet composition by at least about 2 logs, and for decreasing platelet aggregation by not more than about 40%.

9. The method of inactivating microbes of claim 8  
30 wherein the illuminating step comprises illuminating the platelet composition with pulses of light.

10. The method of inactivating microbes of claim 8 wherein the platelet composition is illuminated with pulses of light having wavelengths within a spectral range of at least between about 240 nm and about 280 nm and having a pulse duration of less than 100 ms.

11. The method of inactivating microbes of claim 8 wherein at least 1% of the fluence of the pulses of light is concentrated at wavelengths within a range of 200 to 300 nm.

12. The method of inactivating microbes of claim 8 wherein the platelet composition is flowed through the treatment chamber at a constant flow rate.

13. The method of inactivating microbes of claim 8 wherein the biological fluid is selected from the group consisting of platelet rich plasma, leukocyte reduced platelets, non-leukocyte reduced platelets, synthetic platelet substitutes, artificial platelets, recombinant platelet products, and mixtures thereof.

14. A method for increasing shelf-life of a platelet composition, the method comprising:  
illuminating the platelet composition with pulses of a light having at least one wavelength within a range of 170 to 2600 nm and a fluence greater than about 0.001 J/cm<sup>2</sup>, and  
repeating the illumination of the platelet composition every 6 hours, the illumination effective for inactivating microbes and for providing a zero net increase of microbial counts in the platelet composition, wherein platelet aggregation is not decreased by more than about 40%.

15. The method of inactivating microbes of claim 14 wherein the platelet composition is illuminated with pulses of light having wavelengths within a spectral range of at least between about 240 nm and about 280 nm and having a pulse duration of less than 100 ms.

16. The method of inactivating microbes of claim 14 wherein the platelet composition is illuminated with an amount of light effective for providing a fluence level of about 0.1 to about 0.6 J/cm<sup>2</sup>.

17. A method for inactivating an endogenous nucleic acid strand, the method comprising illuminating an organisms containing the nucleic acid strand with at least one high-intensity, short duration pulse of incoherent polychromatic light in a broad spectrum.

18. The method according to Claim 17, wherein the nucleic acid to be inactivated is endogenous and contained as part of a mammalian cell, a eukaryotic cell, plant cell, biological tissue, tumor cells, chloroplast, cellular organelle, virus, bacteria, fungi, phage, transposon, spores, vaccine, antigen, prion, vector, or mixtures thereof.

19. A method for inactivating microbes in a platelet composition, the method comprising:  
illuminating the platelet composition with pulses of a light having at least one wavelength within a range of 170 to 2600 nm and a fluence greater than about 0.001 J/cm<sup>2</sup>, and  
repeating the illumination of the platelet composition every 6 hours, the illumination effective for inactivating microbes and for providing a zero net increase of microbial counts in the platelet composition,

wherein platelet aggregation is not decreased by more than about 40%.

20. The method of inactivating microbes of claim 19 wherein the platelet composition is illuminated with  
5 pulses of light having wavelengths within a spectral range of at least between about 240 nm and about 280 nm and having a pulse duration of less than 100 ms.

21. The method of inactivating microbes of claim 19 wherein the platelet composition is illuminated with an  
10 amount of light effective for providing a fluence level of about 0.1 to about 0.6 J/cm<sup>2</sup>.